



Addressing Marine Pollution: An Analysis of MARPOL 73/78 Regulations and Global Implementation Efforts

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Abstract: This article discusses the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships and its implementation in various countries. MARPOL 73/78 was adopted in 1973 and is an international convention aimed at preventing and controlling pollution from ships. Annex V of the convention regulates the disposal of garbage from ships and requires ships to keep a garbage management plan on board. The article compares the participation and implementation of Annex V in different countries, including Vietnam, the United States, and Australia. The article highlights the limitations in implementing Annex V in some countries and reports of non-compliance with the regulations in others. The article also covers the steps the US has taken to enforce the restrictions, such as the Act to Prevent Pollution from Ships. The article's overall message emphasizes the significance of effectively putting international treaties into practice to stop marine pollution and save the marine ecosystem.

Introduction

Ocean health, the health of marine life, and health impacts are all impacted by the global issue of marine pollution. With millions of tonnes of trash being released from ships each year, the shipping sector is a noteworthy contributor to this issue. The International Convention for the Prevention of Pollution from Ships, also known as MARPOL 73/78, was created by the IMO in response to this problem. One of the most generally regarded international accords aiming at avoiding and regulating marine pollution, this agreement has been adopted by more than 150 countries (Becker, 1997).

The laws of MARPOL 73/78 for the avoidance and reduction of pollution by ship-generated trash and their implementation in various nations are the main subject of this article. The convention's Annex V regulates how ships dispose of their waste and mandates that they have a rubbish management strategy on board. Additionally, it forbids the disposal of particular waste materials at certain ranges from the shore. Sea mammals and human health both depend on a clean marine environment; thus, rules are necessary to keep marine pollution at bay.

The article compares the participation and implementation of Annex V in different countries, including Vietnam, the United States, and Australia. The article also highlights the limitations in implementing Annex V in some countries and reports of non-compliance with the regulations in others. The article highlights the significance of effectively implementing international treaties to prevent marine pollution and analyses the steps that the US has taken to enforce restrictions, including the Act to Prevent Shipping Pollution (Onwuegbuchunam et al, [2017](#)).

Literature Review

The regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships

Among the sources of pollution from ships, oil pollution has always been paid special attention to because of the dangerous nature it causes to the marine environment. However, people mostly overlook the potential harms that garbage from a ship can cause to the marine environment, especially plastic waste and hazardous waste. Consequently, it is important to note that ship waste was dumped into the ocean prior to the 1978 Protocol's ratification and Annex V's implementation in 1988. So the phenomenon of direct discharge of ship garbage into the ocean appears everywhere. Ships take advantage of the lack of regulations in this field that discharge garbage directly into the ocean. At the same time, the lack of knowledge of the harmful effects of garbage on the marine environment is also a major cause of garbage disposal. Studies on plastic waste and hazardous waste have shown that this is also a source of potential harm to the marine environment, marine species, and human health. IMO also affirms that ship garbage is also considered to be the cause of death for marine species such as oil and chemicals. Since then, people have paid special attention to garbage from ships (Chen & Liu, [2013](#)).

Annex V MARPOL 73/78's goal is to control and prevent the disposal of trash directly into the sea. This Annex provides comprehensive guidelines for the prevention and management of ship waste. Annex V of MARPOL 73/78 provides a definition and taxonomy for trash. Regulation 1 states that ship generate numerous types of waste, some of which are hazardous to the marine environment. These include plastic and toxic materials. However, plastic garbage, which is harmful to the marine ecosystem, is not even considered. No matter where a ship is functioning in the ocean, MARPOL 73/78 Annex V norms ban the discharge of plastic garbage into the maritime environment. This means that plastic waste must be stored onboard and returned to ports for treatment. Other garbage is only permitted to discharge into the ocean when they meet the strict requirements set out in regulations 3, 4, and 5 of this Annex.

Besides, the Annex also sets out the standards for placards as well as the requirements for the garbage management plan, garbage record book, and port reception facilities. However, there are 86% of fishing vessels under 100GT. The regulations in Article 9 regarding the rubbish management plan and garbage record book, however, are only applicable to ships that are 400 GT and greater. As a result, these vessels cannot be covered by the regulations. The Annex V MARPOL 73/78 gaps have given fishing boats under 400GT permission to dump rubbish into the ocean, including plastic as well as other hazardous material. This circumstance has been there for a while. The IMO was not changed to have stricter restrictions for ships of 100GT and above until 2017. All boats of 100GT and above or any ship authorized to carry 15 or even more people must comply with the new law and have a trash management plan. The rules for the rubbish record book have not been altered in the interim. As a result, notwithstanding the revisions, the rubbish management program and garbage record book do not apply to a significant number of fishing trawlers less than 100GT. This subject

may require more research and revision (Julian, 2000).

Also, to aid member states in carrying out Annex V, the Maritime Environment Protection Committee (MEPC) has developed and

implemented a number of regulations, the most notable of which is the resolution MEPC (71). Regulations for preventing and controlling maritime environmental degradation by ship-generated trash are illustrated in the following image.

Figure 1

Simplified overview of the discharge provisions of the revised Annex V MARPOL 73/78

Garbage type ¹	All ships except platforms ⁴		Regulation 5 Offshore platforms located more than 12 nm from nearest land and ships when alongside or within 500 metres of such platforms ⁴
	Regulation 4 Outside special areas and Arctic waters (Distances are from the nearest land)	Regulation 6 Within special areas and Arctic waters (Distances are from nearest land, nearest ice-shelf or nearest fast ice)	
Food waste comminuted or ground ²	≥3 nm, en route and as far as practicable	≥12 nm, en route and as far as practicable ³	Discharge permitted
Food waste not comminuted or ground	≥12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5, 6} not contained in washwater	≥ 12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5, 6} contained in washwater		≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2 and paragraph 5.2.1.5 of part II-A of the Polar Code)	
Cleaning agents and additives ⁶ contained in cargo hold washwater	Discharge permitted	≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2 and paragraph 5.2.1.5 of part II-A of the Polar Code)	Discharge prohibited
Cleaning agents and additives ⁶ in deck and external surfaces washwater		Discharge permitted	
Animal Carcasses (should be split or otherwise treated to ensure the carcasses will sink immediately)	Must be en route and as far from the nearest land as possible. Should be >100 nm and maximum water depth	Discharge prohibited	Discharge prohibited
All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse	Discharge prohibited	Discharge prohibited	Discharge prohibited

Source: International Maritime Organization

Implementation of Annex V MARPOL 73/78 in different countries

Implementation of Annex V MARPOL 73/78 in Vietnam: To begin, the Vietnam fleet is no longer on the blacklist maintained by the Asia Pacific Port State Control (Tokyo-MOU). The number of ships in Vietnam is enormous. Nonetheless, the Vietnamese fleet is thought to be outdated because the average life expectancy of a Vietnamese ship is around 17 years. As a result, neither the ship's structure nor its equipment complies with the International Convention's rules nor those of the port state. Because of this,

many vessels are subject to routine inspections, are confiscated, and must make corrections related to Annex V MARPOL 73/78 in foreign ports. As a result, Japanese memorandums of understanding frequently include Vietnam's naval vessels on their blacklists. Since signing on to Annexes V of MARPOL 73/78, however, Vietnam's shipping sector has steadily improved in terms of infrastructure, machinery, paperwork, and certificates related to the prevention of marine pollution by the trash from ships (Julian, 2000). Therefore, as can be seen in the below image, the Tokyo-MOU whitelist has always included Vietnam's maritime fleet:

Figure 2

Vietnam shipping is listed on the Tokyo-MOU statistic.

Blacklist			Whitelist				
2011	2012	2013	2014	2015	2016	2017	2018
not a member of annex V			joined	official member of annex V			

Source: Annual report of Tokyo-MOU

Also, the dramatic decline in the number of Vietnamese ships detained in foreign ports is evidence that Annex V MARPOL 73/78

implementation is increasingly producing favorable results.

Table 1

No. of detentions under Annex V

Year	No. detentions under Annex V	Total No. detentions	No. inspections
2011	25	103	738*
2012	9	56	785*
2013	18	53	767*
2014	7	30	733*
2015	8	30	722*
2016	6	30	742*
2017	9	32	788*
2018	10	32	877*
2019	15	40	774*

Source: Vietnam Register

*Source: Annual report of Tokyo-MOU

As can be seen in the table previous section, 2014 marked a watershed year for Vietnam's maritime industry, with a dramatic drop in the number of

ship detentions across the board, such as those under Annex V. The attempt to implement Resolution No. 1517/Q-Ttg 2014 on the upgrading

of the Vietnamese shipping fleet and to enhance the standards of maritime transport services has yielded these successes. Decision No. 1517/Q-Ttg mandates the elimination of subpar ships, outdated ships, and ships that don't adhere to marine safety regulations or environmental protection (Van Tan, [2016](#)).

Additionally, based on its experience implementing MARPOL 73/78 Annexes I and II, the Vietnamese government issued Decision No. 795/Decision-Prime Minister to adopt MARPOL 73/78 Annexes V, III, IV, and VI. According to the Decision, this field's laws must be reviewed by the Transportation Ministry and other pertinent agencies. Competent state agencies must conduct an assessment and perfect the laws of this field. In order to accomplish that task, it is necessary to study the guidance of IMO on the implementation of Annex V. Besides, to shorten the time to complete the law, it is necessary to study the laws of other countries. These countries' experience in building and perfecting the law is a valuable experience for Vietnam.

Vietnam specifically released Circular No.07/2018/TT-BGTVT. It lays out rules for the examination of marine safety, security, and labour, as well as for the prevention of environmental contamination by foreign

commercial vessels in port waters, including oceans, subject to Vietnamese jurisdiction. The Circular extends to foreign ships the rules of Annex V of MARPOL 73/78. Vietnam shall use this Circular as the foundation for exercising its obligation to avoid and manage maritime pollution caused not just by ship waste but also by other causes of ship-related pollution.

Limitations in implementation: Despite the accomplishments listed above, Vietnam still has certain obstacles to conquer. These are as follows:

Firstly, the number of ship detention at foreign ports related to Annex V is increasing. Even by October 2019, the number of ships detention has doubled compared to 2016. If this situation continues, the Vietnamese fleet will again be on the blacklist of Tokyo-MOU.

Secondly, the amount of Vietnam ships detained at foreign seaports for breaking Annex V MARPOL 73/78 has dramatically decreased, per the Tokyo-MOU yearly report, and they frequently appeared on the Tokyo-white MOU's list. Yet, compared to just one or two problems prior to 2014, the frequency of deficiencies pertaining to this Section of a ship has surged recently.

Table 2

Deficiencies of a ship under the Annex V

Company	Ship's name	Deficiencies under Annex V	Total of deficiencies	Port
Chu Lai-Truong Hai Ocean Shipping Company	TRUONG HAI STAR 2 VR 062555 IMO 9419606	3	16	Qinzhou China
Thuan Phat Commercial Transportation Business Co., Ltd.	THUAN PHAT 18 VR 093303 IMO 9565259	5	15	Qinzhou China
Ha Trung Transportation Co., Ltd.	ROYAL FLEET VR 123573 IMO 9593024	3	8	Haikou China
Nam Thinh Company Limited	NAM PHUONG 02 IMO 9551129	3	9	

	VR 093301			Haikou China
Tien Phong Company Limited	DYNAMIC OCEAN 01 IMO 9594262 VR 103477	4	16	Zhanjiang China
Hoang Dat Company Limited	HODASCO 09 IMO 9405356 VR 062466	4	9	Haikou China
Dai Duong Shipbuilding Company Limited	DAI DUONG SEA IMO 9579963 VR 103418	3	16	Zhanjiang China

Source: Vietnam Register

The information in the table shows that the Vietnamese shipping fleet has not fully implemented and complied with Annex V of MARPOL 73/78. There are numerous issues that need to be fixed in the future (Van Truong & Van Tan, 2018).

Finally, the Tokyo-MOU only counts the number of Vietnamese ships that are checked and apprehended while they are on international maritime channels. According to data from the Vietnam Registry, only 400 of the 1593 ships in operation at the moment are considered specialist ships. The fleet's other vessels provide various services, transport goods and people inside the country, and so forth. Vietnamese vessels frequently lack or fail to adhere to the criteria of Annex V and other MARPOL 73/78 Annexes. They also frequently have outmoded, old-age, outdated technology. Moreover, lax regulations on domestic traffic contribute to marine pollution. Even Article 2 of Ministry of Transportation Directive No.07/2018/TT-BGTVT only pertains to the inspection of foreign vessels' maritime environmental protection. As a result, local vessels contribute to the complicated problem of coastal pollution in Vietnam.

In addition, Vietnam hasn't yet implemented an additional law on the prevention and management of marine environmental contamination by ship rubbish in addition to other ship-source pollutants, despite numerous efforts to enhance the law in this area.

Nonetheless, there are still issues with Vietnamese legislation in this area, most notably the partial enforcement of Annex V's rules. The clauses of MARPOL 73/78 Annex V have not been adopted into national legislation. As a result, Vietnam still lacks a clear rule to stop marine environmental contamination caused by ship-generated waste and other forms of pollution.

The QCVN 26:2014/BGTVT has been replaced by the QCVN 26:2016/BGTV Vietnam National Technical Regulation on Marine Pollution Control Structures of Ships. Most of the regulations for the ship's systems and schematic integrity to avoid pollution from toxic compounds in bulk, wastewater, and air are included in the norm. Sadly, it is not possible to regulate ship architecture and equipment to meet Annex V MARPOL 73/78 regulations. In order to overcome these constraints, Vietnam must, at the present time, correctly implement Annex V of MARPOL 73/78 (Van Truong, 2018).

Implementation of Annex V MARPOL 73/78 in the United States

Before the enactment of Annex V of MARPOL 73/78, regulations on the control of maritime pollution by trash generated by ships were drafted, similar to China's. The United States was the first country to formally ratify Annex V in 1979. The United States has enlisted Annex V, making its provisions legally binding throughout the country. Title 33 of the United States Code (USC) relates to navigation and navigable waters

and is mirrored by Title 33 of the Code of Federal Regulations (CFR) relating to navigation and navigable waters (CFR Title 33). To implement the provisions of Annex V and other Annexes to which it is a party, the United States enacted the aforementioned legislation.

Act to prevent pollution from ships (APPS): This Chapter offers fundamental guidelines for reducing marine pollution brought on by ship waste. The Act is applicable to all foreign-flagged ships operating in US waters, while in port, or when subject to American jurisdiction, as well as any ships flying the American flag everywhere in the world. In addition, state ships that are both members of MARPOL 73/78 and of this Convention are subject to the APPS. According to Section 3(c), ships from non-member countries of MARPOL 73/78 are not going to be given preferential treatment over ships from nations that are participants of this Convention. This section, however, only said that "the Secretary shall establish regulations pertaining to the ships of a state not a member to the MARPOL 73/78..." and made no other reference to any special rules for national vessels that are not MARPOL 73/78 members (Ayorinde, [1994](#)).

Warships, navy auxiliary ships, other ships that are owned or controlled by the US government, ships not operated for commercial gain, and other ships expressly exempted by the Convention are also exempt from this provision. Therefore, are these ships exempt from any rules and permitted to discharge any kind of waste into the marine ecosystem? The solution can be found in USC Title 33.

Besides, APPS also provides regulations on pollution certificates and facilities for receiving ship pollutants. However, the regulations in APPS only focus on the issue of residues and mixtures containing oil or noxious liquid substances, while the regulations on ship garbage are not covered in detail.

From the above analysis, it can be noted that the provisions in APPS and MEPL are relatively

similar since they only provide basic provisions in this field. There are no specific and detailed regulations for preventing marine pollution from ship's garbage. However, there are some differences between these two laws. Initially, the fine imposed by APPS for violations of the provisions of APPS or MARPOL 73/78 is different from MEPL. While the MEPL only applies administrative sanctions, APPS will apply administrative sanctions or imprisonment, or even a combination of both. Moreover, if the ship of the country that is a member of MARPOL 73/78 violates the provisions of APPS and provisions of MARPOL 73/78, then the Secretary of State shall refer the matter to that country for a reasonable and satisfactory solution rather than applying the rules set out in APPS (Ayorinde, [1994](#)).

United States Code Title 33-Navigation and Navigable waters (USC Title 33): The United States revised and supplemented chapter 33 of USC Title 33 in order to adapt Annex V MARPOL 73/78 and address the deficiencies of existing regulations. Sections 1901 to 1915 (excluding sewage) provide regulations for preventing environmental pollution from ship sources. The regulations of this article on the avoidance of marine pollution caused by ships must be followed by all ships, whether they are American or foreign ships operating in American waters, with the exception of those ships named in section 1902 (a) (b). Moreover, ships from nations that are not a part of Annex V MARPOL 73/78 are not covered by this chapter. As a result, the Secretary and Administrator must establish rules that apply to ships from certain nations. These rules must be in accordance with Annex V of MARPOL 73/78 and make sure that they are not treated less favourably than ships from nations that are MARPOL 73/78 parties. Additionally, in order to comply with Annex V's requirements, this chapter now also pertains to ships operating in the exclusive free trade zones of the United States in addition to port waters and navigable seas (Act, [1972](#)).

Most of the provisions of Annex V MARPOL 73/78 have been incorporated into this chapter. However, this chapter only has provisions for discharges of garbage in special areas. There are no provisions for discharges of garbage outside special areas as in Annex V MARPOL 73/78. Furthermore, there are some differences between the provisions of “discharges in special areas” when comparing the provisions of section 1902 (d) and regulation 5 of Annex V. In accordance with regulation 5 Annex V, only food waste may be dumped into the marine environment after being ground or comminuted, provided that the size of the trash is no greater than 25 mm and that it is dumped at a distance of 3 nautical miles, or as far away from land as is reasonably possible, but no closer than 12 nautical miles. Whereas under section 1902(d), not only food waste but other wastes like paper and cardboard with a size no larger than 12mm are permitted to be released into the surroundings at a range out of 3 nautical miles from the land; in addition, metal and glass waste is permitted to be released into the environment after being ground at a distance out of 12 nautical miles from the land. Thus, the distance to discharge rubbish is specified by both section 1902(d) and rule 5 of Annex V at the same distance. Section 1902 (d) of the Clean Water Act permits the discharge of new forms of trash into the marine environment, but it also imposes stricter limitations on the amount of trash that may be discharged.

This law mandates that ships, including those listed in section 1902(b) and warships, naval auxiliary, etc., have the necessary tools to gather and store waste, particularly plastic waste. Ships must simultaneously employ technical techniques to reduce the quantity of waste they produce. Any acts of dumping garbage into the maritime environment are prohibited if they are not done for the objectives of ensuring the ship's safety, the crew's health, or the preservation of life at sea (Act, [1972](#)).

If there is a violation of the provisions of Annex V or the provisions of this chapter, the

competent authority shall inspect that vessel in accordance with section 1907 and will be subject to criminal or civil penalties under sections 1908 (a) and 1908 (b). And, when the ship of the country is a member of Annex V violates the provisions of the Convention and this chapter, the United States shall prioritize contacting and negotiating with that national government and then take appropriate action rather than direct application the provisions of this Chapter 1908 (f).

The Marine Plastics Pollution Research and Control Act (MPPRCA) was swiftly passed in the United States in 1987 in response to an assessment of the possible threats that plastic trash poses to the marine environment, ecosystem, and human health. This Act was passed to implement Annex V's plastic waste requirements. Thus, USC Title 33 devotes a chapter to setting out regulations on the research, prevention, and reduction of marine debris. NOAA and the US Coast Guard are given this role by the United States. Reduce the negative effects of lost and abandoned fishing equipment on the marine environment and navigation safety. NOAA is fully accountable for tracking, identifying, evaluating impacts, preventing, and eliminating marine debris, with a focus on marine debris posing risks to marine resources and maritime safety. Meanwhile, the U.S. Coast Guard is in charge of carrying out Annex V of MARPOL 73/78, tightening regulations on ship waste, particularly plastic waste, improving waste management, fostering global collaboration to eliminate marine debris, etc.

In summary, the provisions in this chapter for the protection of the marine environment under the influence of the ship's garbage as well as other pollutants from the ship are relatively complete and detailed. Most of the basic provisions of Annex V have been incorporated into United States law. Penalties are also added to handle violations (Act, [1972](#)).

Code of Federal Regulations Title 33- Navigation and Navigable Waters (CFR Title 33):

With the characteristics of the United States law system, when Congress passes a law, that law is known as the United States Code (or USC). However, New USC cannot be enforced until new regulations are issued. Those regulations implement the USC and are known as the Code of Federal Regulations (CFR). Therefore, in order for USC Title 33 to take effect and fill the shortcomings in USC Title 33, chapter 33, the United States must issue CFR Title 33.

The regulations on preventing marine pollution due to ship garbage are stipulated in subchapter O, from section 151.51 to section 151.79. The purpose of this subchapter is to implement Annexes V of MARPOL 73/78 and supplement the shortcomings of USC Title 33. The provisions of Annex V MARPOL 73/78 have been incorporated into this chapter. Therefore, this chapter provides detailed regulations on preventing marine pollution due to the ship's garbage. However, the provisions of this chapter are more stringent than those of specific Annex V. Initially, CFR Title 33 requires that all oceangoing ships other than a fixed or floating platform with a length of 12.2m or more must have a garbage record book. Meanwhile,

Regulation 9 of Annex V applies to ships of 400 tons gross tonnage and above (approximately 76m ~ 140m according to Victor R., Restrepo study) or ships carrying 15 people or more. Secondly, CFR Title 33 also requires all oceangoing ships or other than a fixed or floating platform of a length of 40 feet (approximately 12.2 meters) or more must have a garbage management plan. While MEPC.295(71) requires a garbage management plan for ships of 100GT and above (100GT approximately 19m ~ 35m according to Victor R., Restrepo study). Last but not least, regulation 9 of Annex V is superseded by section 151.59's more rigorous regulations on placards. This part pertains to ships that are 26 feet or longer, while regulation 9 applies to ships that are 12 meters or longer (approximately 40 feet in length). In particular, anyone who violates the aforementioned rules faces a class D felony charge in addition to a civil penalty for each violation (Al-Ubaydli, & McLaughlin, 2017).

From the above analysis of CFR Title 33 regulations on marine pollution prevention due to ship garbage, it is possible to summarize the regulation of the subchapter by the following statistics table.

Table 3

Garbage discharge requirements under CFR

Garbage Type	All Vessels Except Fixed or Floating Platforms and Associated Vessels		Fixed or Floating Platforms & Assoc. Vessels ³ (33 CFR 151.73)
	In special areas ² (33 CFR 151.71)	Outside special areas (33 CFR 151.69)	
Plastics—includes synthetic ropes and fishing nets, and plastic bags	Disposal prohibited (33 CFR 151.67)	Disposal prohibited (33 CFR 151.67).	Disposal prohibited (33 CFR 151.67).
Dunnage, lining, and packing materials that float	Disposal prohibited (33 CFR 151.71).	Disposal prohibited less than 25 miles from the nearest land and in the navigable waters of the U.S.	Disposal prohibited.

Paper, rags, glass, metal bottles, crockery, and similar refuse.	Disposal prohibited (33 CFR 151.71).	Disposal prohibited less than 12 miles from the nearest land and in the navigable waters of the U.S.	Disposal prohibited.
Paper, rags, glass, etc. comminuted or ground. ¹	Disposal prohibited (33 CFR 151.71).	Disposal prohibited less than 3 miles from the nearest land and in the navigable waters of the U.S.	Disposal prohibited.
Victual waste is not comminuted or ground.	Disposal prohibited less than 12 miles from the nearest land.	Disposal prohibited less than 12 miles from the nearest land and in the navigable waters of the U.S.	Disposal prohibited.
Victual waste comminuted or ground. ¹	Disposal prohibited less than 12 miles from the nearest land.	Disposal prohibited less than 3 miles from the nearest land and in the navigable waters of the U.S.	Disposal prohibited less than 12 miles from the nearest land and in the navigable waters of the U.S.
Mixed garbage types. ⁴	See Note 4	See Note 4	See Note 4

Source: Code of Federal Regulations

Note 1: Garbage that has been broken down or crushed up needs to be allowed to pass thru a screening with a mesh size of no more than 25 mm. (1 inch) (33 CFR 151.75).

Note 2: The Adriatic, Pomeranian, Black, Red, and Northern Seas regions, as well as the Gulf region, are special areas covered by Annex V. (33 CFR 151.53).

Note 3: All stationary and movable platforms active in the exploration, exploitation, or connected offshore processing of seafloor mineral resources are included, as well as all ships within 500 meters of such structures.

Note 4: The more rigorous disposal limitations must be followed when rubbish is combined with other dangerous substances that have differing disposal or discharge criteria (Al-Ubaydli, & McLaughlin, 2017).

Although Annex V MARPOL 73/78 has not yet taken operation, the United States has established laws in this area, such as the Act to Control Pollution from Ships 1980, as a result of its assessment of the significance of preventing maritime pollution due to ship's rubbish. As analyzed above, APPS only has general provisions for preventing marine pollution by ships. APPS does not have specific regulations for the ship's garbage. However, these are the basic provisions for the United States to continue to improve laws in this field. After Annex V became effective, the provisions of this Convention were quickly incorporated into the USC Title 33 and CFR Title 33. Moreover, among the types of ship's garbage, plastic waste is always paid special attention to. As known, plastic waste always poses potential risks to the marine environment. In order to implement Annex V of MARPOL 73/78, the United States swiftly passed the Sea Plastic Pollution Research and Control Act of 1987.

Moreover, based on the above analysis of the United States regulation of this field, it is found that United States regulations are more stringent than those specified in Annex V and MEPC.295(71). In particular, the issue is considered to be inadequate in regulation 9 of Annex V for ships under 400 gross tonnages that have been remedied in CFR Title 33. The United States has a comprehensive system of laws to combat the degradation of the marine ecosystem by ship waste, thanks to the rules in the APPS, USC Title 33, and CFR Title 33. It is the outcome of Annex V MARPOL 73/78's full integration. However, comparing the Chinese and the United States regulations, it is found that USC Title 33 and CFR Title 33 lack regulations for receiving waste at ports. APPS only has a few basic regulations in this field (Al-Ubaydli, & McLaughlin, [2017](#)).

Implementation of Annex V MARPOL 73/78 in Australia

Preservation of the Ocean (Prevention of Pollution from Vessels) Act 1983 (1983 Act) and Maritime Order 95 are two pieces of Australian legislation that address this issue (2013). Australian law is characterized by common law, so for the International Convention to take effect, the provisions of the Convention must be incorporated into Australian law. Therefore, in order for Annex V to take effect in Australia, the provisions of Annex V have been incorporated into Act 1983 (amendment 2017) and Marine order 95 (amendment 2018).

An essential Australian Commonwealth law that applies to MARPOL 73/78 is The Act 1983. All MARPOL 73/78 rules for ship-related pollution sources, including those pertaining to rubbish, are included in this Act. In light of this, it is a specialized regulation that governs the prevention and management of maritime environmental contamination caused by ship waste and other contaminants. This Act, which is divided into six main sections, outlines and strictly regulates how ship-source pollution must comply with laws protecting the marine

environment. This details the law in part IIIC for the avoidance and management of marine pollution from ship waste (White, [2001](#)).

All of the rules from Annex V and MEPC.295 (71) are incorporated into Part IIIC (Prevention of Pollution by Garbage), making it illegal for anyone to dump trash into the ocean. The rules outlined in this Act are applicable to the discharge of trash into designated regions, outside the territorial waters, on the inside of the exclusive economic zone, and even beyond the economic zone if the ships involved are Australian. If garbage complies with Annex V MARPOL 73/78 criteria, it may also be dumped into the environment. It's crucial to remember that plastic garbage cannot ever be dumped anywhere or anytime into the marine ecosystem. When dumping rubbish to protect ships and personnel or save lives at sea, the rules of this Article won't apply.

Australia has rather good protections against marine pollution brought on by ship waste because of the incorporation of Annex V MARPOL 73/78 regulations into Act 1983. However, only Australian ships are covered by Act 1983's requirements. Foreign vessels are not subject to these rules. Consequently, Australia issued Marine Order 95 to correct the flaw in Act 1983. To implement Annex V of MARPOL 73/78, Marine Order 95 (Marine pollution prevention-garbage) was published in 2013. Marine Order 95 is a unique regulation that addresses the avoidance of rubbish from ships polluting the ocean. The Act of 1983 and Annex V of MARPOL 73/78 serve as the foundation for this rule. Marine Order 95 lays out specific guidelines for preventing rubbish from ships from polluting the ocean. Marine Order specifically highlights that Australian vessels were also subject to these laws when they were operating on international seas (White, [2001](#)).

One particular thing is that Australia is a Federal State; in addition to the general legal provisions for the entire Australian territory, States are also based on that general regulation

build their regulations. Therefore, to prevent pollution of the state's marine environment due to the ship's garbage as well as other sources of pollution from ships. Can point out; the Act or regulation of Queensland (QLD), New South Wales (NSW), Victoria, South Australia (SA), Tasmania (TAS), Western Australia (WA), the Australian Capital Territory (ACT), and the Northern Territory (NT). However, there is a problem between the applications of Australian or State law to the prevention of marine pollution due to the ship's garbage. The question is whether federal law or the law of states will be applied in practice. According to the agreement between Australia and the States in the Offshore Constitutional Settlement 1979, States have powers within 3 nautical miles. Therefore, each State has jurisdiction to pass its legislation, including giving effect to the International Conventions (White, 2001).

Since the early 1980s, Australian law has been established in this area. Australia also takes part in the international treaty on preventing ship-related maritime environmental contamination, such as ship waste. The principles of MARPOL 73/78 must be implemented into Australian law in order for the agreement to take effect, given the peculiarities of Australian law. As a result, the majority of the clauses in Annex V of MARPOL 73/78 are now part of Australian legislation. Act 1983 and Marine Regulation 95 specifically incorporated the Annex V provisions. The provisions of Act 1983 and Marine Regulations 95 provide Australia with a thorough legislative structure to prevent and control marine pollution brought on by ship waste as of the present. However, the fact that neither Act 1983 nor Marine Orders 95 contain laws addressing the acceptance of rubbish in ports renders Australian law in this area less comprehensive.

Another aspect that can be pointed out from Australian legislation analysis is the responsibility and the protection of the marine environment as a result of ship-source pollution as well as ship's garbage, not only the duty of the

Australian government but also of the common of all States. According to the above analysis, not only the Australian Government but also the Australian states have paid much attention to the protection of the marine environment and the incorporation of International Conventions into domestic laws. Therefore, aside from the Australian government issuing the regulations, each Australian State also issued its regulations on this issue to prevent pollution of the marine environment from the effects of garbage from ships. States are based on Australian legislation and International Conventions that enact their laws. Through analysis, despite a large number of laws and regulations in this field, however, there is no overlap or conflict between Australian laws and State laws. In order to achieve such results, Australia has fully enforced the principle in the Constitution of Australia 2013 and the agreement between Australia and the States in the Offshore Constitutional Settlement 1979. The only problem is the lack of skills in maritime legal law in various government departments, the State, and the Commonwealth, although this is gradually being overcome. Another issue, this chapter sets out the various laws of the Commonwealth as well as the Australian States and Northern Territories in effect for Annex V MARPOL 73/78. It may be seen from this exercise that the Australian offshore jurisdiction is confused and confusing. Combining the law of the Commonwealth of Australia with the Australian States and the Northern Territory proves that in Australia, the attention of experts is required to simplify the implementation of the Convention (White, 2001).

In summary, among the countries selected for research, the United States has developed laws in this field since the late 1970s, while China and Australia were in the early 1980s. Although Vietnam was a member of this Annex year ago, however, Vietnam has not yet had a specific regulation for this field. The noticeable difference between Vietnam and those countries is the delay in the accession and implementation of the Convention. Up to the present, Annex V MARPOL

73/78 has not been effectively implemented in Vietnam. It is the result of comparing Vietnamese laws with Chinese, United States, and Australian laws. China has flexibly incorporated the provisions of Annex V into the MEPL, 2010 Regulation, and a variety of other regulations; The United States not only incorporates most of the provisions of this Annex into APPS, USC Title 33, and CFR Title 33 but also provides more stringent regulations than Annex V; The same goes for Australia when the provisions of Annex V are incorporated into Act 1983 and Marine Order 95.

Research Methodology

This law article employs a qualitative research methodology to analyze the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships and its implementation in different countries. The methodology involves a comprehensive review of existing literature on the subject, including journal articles, reports, and legal documents.

The literature review is conducted using a systematic approach to identify relevant studies and assess their quality. The search strategy includes electronic databases, such as PubMed, Scopus, and Web of Science, using keywords such as "MARPOL 73/78," "garbage from ships," "implementation," and "enforcement." The inclusion criteria are studies that provide insights into the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships and its implementation in different countries.

The data analysis involves a thematic approach to identify key themes and patterns in the literature. The themes are organized around the research questions, including the history of MARPOL 73/78, the regulations of Annex V, and the implementation of Annex V in different countries. The analysis also involves a comparative approach to identify similarities and differences in the implementation of Annex V in different countries.

The findings of the analysis are presented in the literature review section of the article, which provides a comprehensive overview of the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships and its implementation in different countries. The discussion section of the article presents an interpretation of the findings and their implications for policy and practice.

Limitations of the methodology include the reliance on secondary sources of data and the potential for publication bias. To address these limitations, the study employs a systematic search strategy and assesses the quality of the literature to ensure the reliability and validity of the findings.

Overall, the research methodology adopted in this law article provides a rigorous and systematic approach to analyzing the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships and its implementation in different countries.

FINDINGS

Overview of the regulations of MARPOL 73/78 for the prevention and control of pollution by garbage from ships

An international agreement known as MARPOL 73/78 was established in 1973 and became effective in 1978. It constitutes one of the most significant international agreements governing the reduction of ship-related marine pollution. Specifically, MARPOL 73/78's Annex V addresses measures to prevent and reduce pollution caused by ship waste.

Ships are required to put preventative and mitigation measures in place in accordance with Annex V MARPOL 73/78 regulations. Except in some cases, such as the dumping of food waste in designated locations and the disposal of cargo remnants that are not damaging to the maritime environment, it is strictly illegal for ships to discharge garbage.

In accordance with the laws, ships must also have a Garbage Management Plan (GMP) that specifies the steps to be taken for rubbish collection, storage, and disposal. The crew must put the GMP into practice after receiving flag state approval. Ships must also maintain a Garbage Record Book (GRB), which records all activities and discharges linked to rubbish, in accordance with Annex V requirements (Abbas, Khan, & Gul, [2022](#)).

The ship's flag state is in charge of upholding the requirements of Annex V of MARPOL 73/78. Flag states are obligated to make sure that their ships abide by the convention's rules and to take the necessary action against any ships that do not. The enforcement of Annex V MARPOL 73/78 regulations also falls under the purview of port nations. They have the right to examine ships and imprison them if they don't adhere to the rules.

The Annex V Regulations Over time, MARPOL 73/78 has been amended to meet new problems with maritime pollution caused by ship waste. The International Maritime Organization (IMO) amended Annex V in 2013 to forbid the dumping of all types of trash into the ocean, with the exception of food waste, in certain circumstances. The revisions also add additional rules for using rubbish collection and treatment in ports and disposing of wasted food in particular regions.

The rules of Annex V of MARPOL 73/78 offer a thorough structure for the avoidance and handling of marine pollution by ship-generated

trash. According to the rules, ships must apply strategies to reduce the amount of trash they dump into the ocean, keep a rubbish record book, and keep a trash management plan current. Authorities in the flag country and port state are in charge of enforcing the rules. Over time, the rules have been amended to meet new concerns and boost the performance of the convention (Abbas, Khan, & Gul, [2022](#)).

Comparison of the implementation of Annex V MARPOL 73/78 in different countries

Although the timing of taking part in the Convention is not the same, however, up to the present, China, the United States, Australia, and Vietnam are members of this Annex. The United States was not only the first country to take part in Annex V but also has many contributions to the completion of this Annex. This Annex entered into force in 1988. The same year China has taken part in Annex V. Two years later Australia. Meanwhile, the latest country participating in this Annex is Vietnam (see table below). Because of that delay, the implementation of the Convention is still facing many difficulties in Vietnam. As analyzed, Vietnamese law still lacks many important regulations on preventing marine pollution due to garbage from ships. In particular, the provisions of Annex V have not been effectively implemented. However, after being officially a member of V MARPOL 73/78, Vietnamese law in this field is also gradually improving and achieving praiseworthy results. In the past few years, the implementation of this Annex is reflected in the results as follows.

Table 4

Parties to the Annex V MARPOL 73/78

Country	Convention	Annex V MARPOL 73/78
China	Ratification	21 November 1988
	Entry into force	21 February 1989
United States	Ratification	30 April 1979
	Entry into force	31 December 1988
Australia	Ratification	14 August 1990
	Entry into force	14 November 1990

Vietnam	Ratification	19 December 2014
	Entry into force	19 March 2015

Source: ECOLEX–The gateway to environmental law

Analysis of limitations and challenges in implementation

The implementation of the regulations of Annex V MARPOL 73/78 for the prevention and control of marine pollution by garbage from ships faces several limitations and challenges in different countries.

In Vietnam, the implementation of Annex V MARPOL 73/78 has faced several challenges. One of the challenges is the lack of awareness and knowledge among shipowners and crew about the regulations. This has led to non-compliance and the improper disposal of garbage into the sea. Another limitation is the lack of adequate infrastructure, such as garbage reception facilities in ports, which makes it difficult for ships to dispose of their garbage properly. The lack of sufficient resources and manpower for the enforcement of the regulations is another challenge (Abbas, Khan, & Gul, 2022).

In China, the implementation of Annex V MARPOL 73/78 has also faced challenges. One of the challenges is the lack of clear guidance on the implementation of the regulations. This has led to confusion among shipowners and crew about the requirements and procedures for the disposal of garbage. Another challenge is the lack of sufficient resources and manpower for the enforcement of the regulations. The limited capacity of the port state control authorities to inspect and monitor ships for compliance with the regulations is also a challenge.

In the United States, the implementation of Annex V MARPOL 73/78 is governed by the Act to Prevent Pollution from Ships (APPS) and the United States Code Title 33–Navigation and Navigable Waters (USC Title 33) and Code of Federal Regulations Title 33–Navigation and Navigable Waters (CFR Title 33). The implementation of the regulations has faced challenges related to the complexity of the legal

framework and the need for coordination among different agencies. The lack of standardization in the enforcement of the regulations by different port state control authorities is also a challenge.

In Australia, the implementation of Annex V MARPOL 73/78 has faced challenges related to the vast coastline and a large number of ports. The lack of adequate infrastructure, such as garbage reception facilities, in some ports has made it difficult for ships to dispose of their garbage properly. The limited capacity of the port state control authorities to inspect and monitor ships for compliance with the regulations is also a challenge.

In conclusion, the implementation of the regulations of Annex V MARPOL 73/78 for the prevention and control of marine pollution by garbage from ships faces several limitations and challenges in different countries. The challenges include the lack of awareness and knowledge, the lack of adequate infrastructure, the limited capacity of the port state control authorities, and the complexity of the legal framework. Addressing these challenges requires coordinated efforts by different stakeholders, including the shipowners, the crew, the port state control authorities, and the flag state authorities. It also requires the development of effective strategies for raising awareness, improving infrastructure, and strengthening enforcement mechanisms.

Discussion

Interpretation of FINDINGS

The analysis of the implementation of Annex V MARPOL 73/78 in Vietnam, China, the United States, and Australia reveals several common limitations and challenges. These challenges include the lack of awareness and knowledge among shipowners and crew, the lack of adequate infrastructure, and the limited capacity of the port state control authorities. The analysis also

reveals that the complexity of the legal framework and the need for coordination among different agencies are significant challenges in the United States.

The findings suggest that addressing these challenges requires coordinated efforts by different stakeholders, including the shipowners, the crew, the port state control authorities, and the flag state authorities. It also requires the development of effective strategies for raising awareness, improving infrastructure, and strengthening enforcement mechanisms.

Implications for Policy and Practice

The findings have several implications for policy and practice. First, the analysis underscores the need for improving awareness and knowledge among shipowners and crew about the regulations. This requires the development of targeted education and training programs that focus on the requirements and procedures for the proper disposal of garbage (Abbas, Khan, & Gul, [2022](#)).

Second, the analysis highlights the need for improving infrastructure, such as the provision of adequate garbage reception facilities in ports. This requires the development of partnerships between the port authorities and the private sector to invest in the development of infrastructure.

Third, the analysis emphasizes the need for strengthening enforcement mechanisms, including the capacity of the port state control authorities to inspect and monitor ships for compliance with the regulations. This requires the development of effective inspection and monitoring programs, the provision of adequate resources and manpower, and coordination among different agencies.

Recommendations for future research:

The analysis also suggests several recommendations for future research. First, future research should focus on the evaluation of the effectiveness of education and training

programs in improving compliance with the regulations.

Second, future research should also focus on the assessment of the economic and environmental costs and benefits of investing in infrastructure, such as garbage reception facilities in ports.

Third, future research should examine the role of technology and innovation in improving compliance with the regulations, such as the development of new methods for the treatment and disposal of garbage (Abbas, Khan, & Gul, [2022](#)).

Overall, the findings, implications, and recommendations underscore the importance of addressing the limitations and challenges in the implementation of Annex V MARPOL 73/78 for the prevention and control of marine pollution by garbage from ships. Achieving this requires coordinated efforts by different stakeholders and the development of effective strategies for raising awareness, improving infrastructure, and strengthening enforcement mechanisms.

Conclusion

This study examined the implementation of Annex V MARPOL 73/78 for the prevention and control of marine pollution by garbage from ships in Vietnam, China, the United States, and Australia. The analysis reveals several common limitations and challenges, including the lack of awareness and knowledge among shipowners and crew, the lack of adequate infrastructure, and the limited capacity of the port state control authorities. The complexity of the legal framework and the need for coordination among different agencies are significant challenges in the United States.

The findings suggest that addressing these challenges requires coordinated efforts by different stakeholders, including the shipowners, the crew, the port state control authorities, and the flag state authorities. It also requires the development of effective strategies for raising

awareness, improving infrastructure, and strengthening enforcement mechanisms. The implications for policy and practice include the need for developing targeted education and training programs, partnerships between the port authorities and the private sector to invest in infrastructure, and strengthening enforcement mechanisms.

In conclusion, the study provides important insights into the implementation of Annex V MARPOL 73/78 for the prevention and control of marine pollution by garbage from ships. Addressing the limitations and challenges identified in this study requires the development of coordinated efforts by different stakeholders and the implementation of effective strategies to improve compliance with the regulations. Ultimately, improving compliance with the regulations is critical for protecting marine environments and ensuring sustainable development in the maritime sector.

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